

# Simplifying Algebraic Expressions

## Vocabulary:

**Like Terms** - more than one term or terms that have the same variables and powers. The coefficients do not matter.  $3x + 5x$

**Unlike Terms** - two or more terms that are not *like* terms, i.e. they do not have the variables or powers.  $3x + 5y + x^2$

**Factored Form** - an expression is in factored form if it is written as the product of its factors  $6(x + 2)$

1. To add or subtract, you <i>must have</i> like terms.	Additional Examples:
Example: $2z + 4z + 3z = 9z$ Example: $5r - 2r = 3r$	$3t + 6r - 8t + 5r$ $11r - 5t$
2. To multiply or divide, you <i>don't need</i> like terms.	Additional Examples:
Examples: $5(2z) = 10z$ $12(3a) = 36a$ $15t \div 3 = 5t$	$4(6x + 2t) + 5x$ Dist $24x + 8t + 5x$ $24x + 5x + 8t$ Comm. Add $29x + 8t$
3. As always, follow the Order of Operations. Use Math Properties to work your way through Order of Operations.	Notes: When have terms with variables and constants, write the constant last
Ex. Simplify: $4(x + 2) + 5(x + 3)$  1. Distribute: $4x + 8 + 5x + 15$ 2. Commutative of Addition: $4x + 5x + 8 + 15$ 3. Combine Like Terms: $9x + 23$ 4. Therefore: $4(x + 2) + 5(x + 3) = 9x + 23$	You try: Simplify: $3(x + y) + 7(2x + 3y)$ $3x + 3y + 14x + 21y$ Dist $3x + 14x + 3y + 21y$ Comm. Add $17x + 24y$

Simplify with a partner:

1.  $(t + 5) + 4(t - 1)$   
 $t + 5 + 4t - 4$   
 $5t + 1$

2.  $5x + 10 \div 2 + 3(x - 1)$   
 $5x + 5 + 3x - 3$   
 $8x - 2$

3.  $12r \div 2 + 3s + 2(2) + 4(s + y)$   
 $6r + 3s + 4 + 4s + 4y$   
 $6r + 7s + 4y + 4$

4.  $3x + 3x^2 - x + 2x$   
 $3x^2 + 4x$

Decide if each expression is equivalent. If they are not, then rewrite an equivalent expression.

1)  $y + y + y = 3y$   
 yes

2)  $2x + 4y + z = z + (y + x) + (y + x) + (y + x)$   
 yes  $2x + 4y + z$

3)  $(m)(n) = m + n$   
 NO  $m \cdot n$

4)  $4a = a \cdot a \cdot a \cdot a$   
 NO  $a^4$   
 $a + a + a + a$

5)  $5y + 8 = y + y + 8 + y$   
 NO  $3y + 8$

6)  $2t + 3t = t + t + t + t + t$   
 $5t = 5t$  yes

Write an equivalent expression using the GCF as a factor.

7)  $25b + 15$   
 $5(5b + 3)$

8)  $7y - 49$   
 $7(y - 7)$

9)  $18t - 36h$   
 $18(t - 2h)$

10)  $8d + 48w$   
 $8(d + 6w)$

11)  $100c - 10$   
 $10(10c - 1)$

12)  $\frac{3}{4}m + \frac{3}{4}r$   
 $\frac{3}{4}(m + r)$